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Thema
AG Bodengase

Neue Entwicklungen bei Methoden zur Messung und bei der Modellierung von Spurengasflüssen

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Titel
Combining a root exclusion technique with continuous measurements of CO_2 by chambers and inside soil for a pin-point separation of ecosystem respiration in croplands

Abstract
To better assess ecosystem C budgets of croplands and understand their potential response to climate and management changes, detailed information on the mechanisms and environmental controls driving the individual C flux components are needed. This accounts in particular for the ecosystem respiration (R_{eco}) and its components, the autotrophic (R_a) and heterotrophic respiration (R_h) which vary tremendously in time and space. Therefore, we developed and tested a method to separate R_{eco} into R_a (as the sum of $R_{a\ (shoot)}$ and $R_{a\ (root)}$) and R_h in order to detect temporal and small-scale spatial dynamics within their relative contribution to overall R_{eco}. <ins datetime="2017-01-08T10:49"></ins>Investigations were carried out for winter wheat (Triticum aestivum) during the crop season 2015 at an experimental plot (CarboZALF-D) located in the hummocky ground moraine landscape of NE Germany. R_{eco} was derived from CO_2 flux measurements from plant stand and soil during nighttime using automatic chambers. R_h was derived from CO_2 efflux measurements from fallow next to the automatic chambers using CO_2 sampling tubes in 10 cm soil depth. $R_{a\ (root)}$ was calculated as the difference between CO_2 efflux measurements in planted soil and R_h. $R_{a\ (shoot)}$ was calculated as R_{eco} - $R_{a\ (root)}$ - R_h. R_{eco} varied seasonally from <1 to 9.5 g C m^{-2} d^{-1}, and was higher in adult (a) and reproductive (r) than juvenile (j) stands (g C m^{-2} d^{-1}: j 1.2, a 4.6, r 5.3). Observed R_a